

SUPERFUND SITE FINAL CLOSEOUT REPORT  
Bonneville Power Administration/Ross Complex  
Vancouver, Washington

**INTRODUCTION**

This Final Close Out Report documents that the Bonneville Power Administration (BPA), under the oversight of the Environmental Protection Agency (EPA) and Washington State's Department of Ecology (Ecology), completed all construction activities for the BPA/Ross Complex in accordance with Procedures for Completion and Deletion of National Priority Sites (OSWER Directive 9320.2-3A) and updates thereto. EPA in conjunction with BPA conducted the final inspection on December 15, 1995 and determined that the remedial action has been successfully executed.

The lead agency for remediation of the BPA/Ross Complex Superfund site is BPA, which is a wholesale electrical power marketing administration under the U.S. Department of Energy. BPA performed an extensive remedial investigation at the site as well as numerous remedial actions. The EPA and Ecology are the two agencies responsible for ensuring applicable federal and state environmental regulations have been addressed and that the corrective action taken at BPA is consistent with appropriate environmental standards and is protective of human health and the environment.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, also known as Superfund, is the federal legislation that governs the regulatory action of hazardous waste sites and their cleanup activity. CERCLA is administered and enforced by the EPA. In addition to CERCLA, hazardous waste sites in the state of Washington must comply with the requirements of the Model Toxics Control Act (MTCA). The Department of Ecology administers and enforces MTCA. MTCA is the State of Washington's counterpart legislation to CERCLA. The Act is very similar to CERCLA, but often times poses more stringent standards and cleanup levels. It is important to note that the cleanup and remediation activities performed at the BPA/Ross Complex comply with both CERCLA and MTCA.

**SUMMARY OF SITE CONDITIONS**

**Background**

The BPA Ross Complex (referred to hereafter as the Site) consists of a 235-acre tract in Clark County on the eastern side



of U.S. Highway 99 and is bordered to the north by Cold Creek Canyon (Cold Creek), a Burlington Northern Railroad right of way, NE Minnehaha Street, and to the east and south by a residential neighborhood. Burnt Bridge Creek borders the Site to the southwest and west, and Highway 99 and Interstate 5 border the Site to the west. The primary supply of drinking water in the Vancouver area is obtained from the Troutdale aquifer and is distributed by Clark Public Utilities through well fields. The well fields are located both hydraulically upgradient and downgradient of the Site. Well field #3 is located immediately downgradient of the Site while private wells are located within one mile surrounding the Site.

The Site is an active facility that has been owned and operated by the BPA since 1939 to coordinate the distribution of hydroelectric power generated by the Federal Columbia River Power System to regions throughout the Pacific Northwest. Since its construction, the Site has provided research and testing facilities, maintenance and construction operations, and waste storage and handling operations for BPA. Maintenance activities at the Ross Complex have routinely involved handling transformer oils containing polychlorinated biphenyl's (PCBs), and organic and inorganic compounds associated with the storage of preserved wood transmission poles, paints, solvents, and waste oils. Testing and laboratory activities include the use of heavy metals and other organic and inorganic compounds.

The Site was listed on the National Priorities List in November 1989 based on the presence of volatile organic compounds (VOCs) in groundwater and the Site's proximity to the City of Vancouver's drinking water supply. As a result of the listing, and pursuant to a Federal Facility Agreement (FFA) signed by BPA, EPA and Ecology on May 1, 1990, BPA conducted a Remedial Investigation/Feasibility Study (RI/FS) to determine the nature and extent of contamination at the Site and to evaluate alternatives for cleanup of contaminated areas.

#### REMEDIAL PLANNING ACTIVITIES

The RI field investigation began in the summer of 1991 and was completed in September 1993. It included the collection and chemical analysis of surface and subsurface soil, water, sediment, and groundwater in an effort to characterize the nature and extent of contamination at the Site. Initially, the RI was designed to address the entire Site as one operable unit (OU). However, during the summer of 1991, BPA in conjunction with EPA and Ecology decided that the Site would be divided into two separate OUs (OUA and OUB) to facilitate the Superfund process.

The OUA RI addressed potential surface soil contamination at 21 different waste units on the Ross Complex. The OUB RI focused on characterization of subsurface soils in two waste units and



also included characterization of the shallow perched water table, the deep groundwater aquifer beneath the Site, and surface water and sediments in Cold Creek and Burnt Bridge Creek.

#### **Operable Unit A**

Of the 21 waste units evaluated as part of OUA, only the following 3 areas required remedial action

- **Wood Pole Storage Area East** - High polycyclic aromatic hydrocarbons (HPAH's) and pentachlorophenol (PCP) were identified as contaminants of concern. Both are considered to be carcinogenic. The source of this contamination was from chemicals that dripped from the treated wood poles stored in this area. HPAH's were detected in soils throughout this waste unit from the surface to a maximum of three feet. PCP was detected as a surface contaminant throughout this area. The highest level of HPAH detected was 193 mg/kg and for PCP, 140 mg/kg.
- **Ross Substation and Capacitor Yard** - PCBs were the compound of concern identified in the soils. This is a 10-acre fenced area that contains numerous capacitors and transformers. Spills of PCB oils from faulty capacitors and leaking equipment have occasionally occurred within the substation. The results of the RI identified PCB soil levels up to 130 mg/kg.
- **Capacitor Testing Laboratory** - PCB containing oils were reportedly spilled in and around the laboratory when it was in use. PCBs were detected in surface soils at concentrations up to 42 mg/kg.

The final OUA Feasibility Study identified and evaluated cleanup alternatives that included excavation and off-site disposal and various on-site containment and treatment options.

#### **Operable Unit B**

The shallow or perched water tables and the deep aquifer beneath the Ross Complex were tested for a wide range of potential contaminants including VOC's, pesticides, herbicides, metals, base neutral acids, PCB's, phenols, phthalates and polycyclic aromatic hydrocarbons (PAH's). The primary contaminants found in the groundwater were 1,1,1-Trichloroethane (TCA) and 1,1-Dichloroethene (DCE). The maximum concentration for TCA was .82 mg/L found during April 1989 in a shallow groundwater monitoring well (MW-4A). The maximum concentration for DCE was .014 mg/L found in April 1992 in a deep monitoring well (MW-13B, the only deep well to measure an exceedence of drinking water standards).



In the Fog Chamber Dump Trench Area 1, subsurface soil contaminants of concern were antimony, arsenic, copper, lead, zinc, HPAHs and PCBs. The highest values found were for PCBs (30,000 ppm at eight feet below the surface). In Trench Area 2, high levels of metals were detected in subsurface soils, however, there is clean soil and vegetation covering this trench area. The investigation also indicated that the Site did not contribute any contaminants to Burnt Bridge Creek. The contaminant load in this creek originated upstream of the Complex. No sediment contamination was detected in Cold Creek.

Since no groundwater, surface water or sediment remedial action was necessary based on the results of the OUB RI, the final OUB FS only identified and evaluated cleanup options for the Fog Chamber Dump Trench Area 1. The alternatives included excavation with off-site disposal, on-site containment, and off-site treatment and disposal.

#### RECORD OF DECISION

The Record of Decision (ROD) for OUA was signed on May 6, 1993, and all remedial actions were completed by January, 1996. Cleanup levels are based on the requirements of MTCA. At the Wood Pole Storage Area East, the residential cleanup levels of 1 ppm for HPAHs and 8 ppm for PCP were required by state law due to the waste area's proximity to nearby private residences. Since the Substation and Capacitor Yard constituted a fenced industrial area, the industrial cleanup level of 10 ppm for PCBs was appropriate to use under MTCA. However, at the Capacitor Testing Laboratory the residential cleanup level of 1 ppm for PCBs was required under MTCA. The major components of the selected remedies included:

(1) **Wood Pole Storage Area East**

- An innovative form of bioremediation which utilizes geochemical enhancements (UV light, hydrogen peroxide, and ethanol);
- Capping soil residuals which failed to meet targeted cleanup levels; and
- Institutional controls.

(2) **Ross Substation and Capacitor Yard/The Capacitor Testing Laboratory**

- Excavation of PCB contaminated soil, concrete footings, and debris;
- Disposal at an off-site hazardous waste landfill;

- Backfilling with clean soils; and
- Institutional controls.

The ROD for OUB was signed September 29, 1993, and the required remedial action completed by September, 1994. The major components of the selected remedy for the Fog Chamber Dump Trench Area 1 include:

- Installation of a multi-layered permanent cap; and
- Institutional controls including a security fence and placarding.

The OUB ROD also required groundwater monitoring for a period of 2 to 5 years on a bi-annual basis for 1 shallow and 3 deep on-site wells. These wells are to be monitored for chloroform, 1,1,1-TCA, 1,1-DCA, and 1,1-DCE.

### CONSTRUCTION ACTIVITIES

#### **Wood Pole Storage Area East**

All soils that exceeded the targeted cleanup levels of 1ppm for HPAHs and 8ppm of PCP were excavated from the pole yard. A total of 2,300 cubic yards of material was excavated and stockpiled. Sampling of the yard indicated that the primary portion of the yard that needed to be remediated was the fine fraction of the soils taken from under the wood pole storage piles. The average contaminant concentration for this fraction of the soil was 37 ppm for HPAH and 33.9 ppm for PCP.

During the fall of 1994 a temporary treatment facility (tent) was erected at the site. Four treatment beds were constructed in the tent for treating the soils. Since it was known at the outset that conventional bioremediation alone would not meet the cleanup goals, various enhancements were used in conjunction with the bioremediation. These enhancements included hydrogen peroxide (35%), ethanol, non-germicidal UV or ultraviolet light, or some combination of one or more of these enhancements.

Each of the four treatment beds was fitted with a subterranean irrigation system that provided a nutrient mixture. The beds were maintained in a moist condition during the entire treatment time. Only beds 1 and 2 were fitted with UV light banks. Each of the beds was sampled every ten days.

Soil treatments were concluded on November 30, 1995. Of the 2300 cubic yards excavated from the pole yard, about 700 cubic yards failed to meet the targeted cleanup levels. In the 700 yards that failed, however, contaminant levels were reduced by



80% for both HPAH and PCP. After treatment, this material was returned to the pole yard and 3,000 cubic yards of clean gravel was applied as a covering that provided a 6" thick cap over the entire yard.

#### **Ross Substation and Capacitor Yard/Capacitor Testing Laboratory**

The same remedy was selected for each of these areas where the contaminant of concern was PCBs in surface soils. A total of 2,544 tons of contaminated soil was excavated and disposed at an off-site TSCA landfill in Arlington, Oregon. PCB-contaminated concrete footings and debris were also removed and disposed offsite. All soil remediation and confirmation sampling in the Substation and the Capacitor Testing Laboratory were completed in January, 1994. Remediation of the Capacitor Yard was completed by August, 1995, at the time when BPA replaced the PCB electrical equipment with new non-PCB capacitors.

#### **Fog Chamber Dump Trench Area 1**

Installation of the cap was completed in October of 1994. The Fog Chamber Dump Trench Area 1 cap consists of a number of layers which form an impervious barrier that eliminates the potential for human contact and minimizes surface water infiltration. Compacted clean fill was placed immediately over the waste area which was then covered by a geosynthetic clay liner (GCL). Another layer of compacted clean fill designed to provide for a 2% drainage slope was placed over the GCL. A 40 mil high density polyethylene geomembrane line was installed over the waste unit and a 6 inch compacted sand layer then placed on top of the geomembrane liner. A 100% polypropylene fabric was installed above the sand layer to keep the top layer of crushed rock (compacted to a minimum depth of 4 inches) from sinking into the sand. The compaction of this top layer also provides a surface that will support traffic and storage activities. Along the perimeter of the cap is a drainage collection system consisting of 6 inch perforated PVC drain pipe that feeds into an oil/water separator. The entire waste unit is enclosed by a permanent 7 foot fence with a barbed wire top with signs indicating "HAZARDOUS WASTE LANDFILL NO DIGGING."

#### **COMMUNITY RELATIONS ACTIVITIES**

Community relations activities for this site have included the following: development of a community relations plan, meetings with local government officials, public meetings during the RI and remedy selection process, a public comment period for the proposed plans, neighborhood meetings with residents who live adjacent to the Ross Complex, routine publication of progress fact sheets, and extensive newspaper and television coverage during the remedial action phase. A final fact sheet will be



prepared and distributed announcing the deletion of the site from the NPL.

#### DEMONSTRATION OF QA/QC FROM CLEANUP ACTIVITIES

EPA has required all sampling and analytical work associated with the remedial action to meet exacting QA/QC standards. BPA submitted a detailed Quality Assurance Program Plan (QAPP) which required compliance with all EPA QA/QC procedures and protocols. EPA and Ecology reviewed and approved the plan prior to its implementation. During the RI EPA routinely reviewed BPA's data validation packages and worked closely with BPA's contractor to ensure that the QAPP was being implemented. Only EPA or Ecology approved analytical methods and programs were used for the RI/FS, extent of contamination sampling and confirmation sampling. EPA has determined that all analytical results reported are accurate to the degree needed to assure satisfactory execution of the remedial action consistent with the ROD and remedial design plans and specifications.

#### MONITORING RESULTS

To ensure compliance with remedial action objectives, a detailed and rigorous monitoring program was developed for BPA/Ross Complex remedial actions. The program's objectives were to protect the off-site public, protect on-site workers, and confirm compliance with the remedial action objectives outlined in the ROD. Specifically, the following actions were initiated:

1. Confirmation soil sampling of remediated areas at the depth of excavation for chemicals of concern;
2. Complete sampling of suspect chemicals for backfill soils; and
3. Analysis of Investigation Derived Waste soils, sediments and liquids.

The OUB ROD required groundwater monitoring for four key onsite wells for a period of two to five years. After two years of groundwater sampling (4 rounds), the results indicate stable groundwater conditions. In the shallow well, levels of TCA have decreased by several orders of magnitude since sampling began and are now below the MCL. In the three deep wells, only MW-13B continues to show a slight exceedance of the MCL for 1,1-DCE. Levels fluctuate from 4 to 14ppb (the MCL is 7ppb). The latest round of sampling (December, 1995) showed a level of 1ppb. No other deep well shows an exceedance for any of the contaminants of concern. At this time, EPA is not requiring BPA to continue monitoring--sampling requirements are suspended until the Five Year Review (September 1998). At that time, if contaminant levels



have stayed the same or have not significantly increased, no further groundwater monitoring will be required.

#### SUMMARY OF OPERATION AND MAINTENANCE

Plans are in place for BPA to inspect and maintain the integrity of the caps in both the Fog Chamber Dump Trench Area 1 and in the Wood Pole Storage Area East, as well as fencing. BPA is also responsible for implementation of the required institutional controls. To ensure that Trench Area 2 at the Fog Chamber Dump remains undisturbed, BPA has included a notice in the Long Term Development Plan for the Ross Complex prohibiting construction activities in the area of concern.

Other remedial actions at this Site have been completed and do not require long-term operation and maintenance.

#### PROTECTIVENESS

The RODs for OUA and OUB addressed all areas of concern described in the NPL listing as well as areas that were not initially mentioned at the time of the listing. As a result of the remedial actions performed at BPA/Ross Complex, all possible exposure pathways from contaminated soils were eliminated and all remedial action objectives established in both RODs have been met. Remedial action for groundwater was not required to protect human health or the environment at the Ross Complex, however, groundwater monitoring was necessary to ensure that low levels of contamination did not significantly increase. Levels have remained stable or have dropped below federal MCLs. No further Superfund response is appropriate in order to provide protection of human health and the environment at this Site.

#### FIVE YEAR REVIEW

Since hazardous substances will remain on site above levels allowing for unlimited use and unrestricted exposure, a statutory five-year review will be conducted in September, 1998, pursuant to OSWER Directive 9355.7-02, "Structure and Components of Five-Year Reviews" (May 23, 1991).

At the five-year review, BPA will conduct one more round of groundwater monitoring to determine if conditions at the site remain stable.

Randall F. Smith  
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April 4, 1996  
Date



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Concurrence for  
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